AMENDMENTS OF CLAIMS

Please cancel claims 1-20.

Please add the following new claims:

21. (New) A method for in situ remediation of an aquifer having a treatment zone through which passes water contaminated with at least one chemical contaminant, which method comprises:

injecting, by at least two conduits, an oxygen-containing gas at a pressure of at least 5 psig above the hydrostatic pressure at injection points; wherein the volume of oxygen-containing gas injected each time at each injection point contains from about 1 to about 100 times of minimum average volume (Vmin) in cubic feet of total oxygen, measured at ambient temperature and ambient pressure, Wherein Vmin can be calculated as:

$$V\ min = 0.1 \times A \times B \times P \div N$$

Wherein A = treated area (square ft)

B = treatment thickness (ft)

P = porosity

N = number of injection points

22. (New) The method according to claim 21, wherein the oxygen-containing gas is injected to the aquifer at a frequency of from about once a week to about ten times a day.

23. (New) The method according to claim 21, wherein each injection of the oxygen-containing gas at each injection point lasts from about 0.05 to about 4 minutes;

24. (New) The method according to claim 21, wherein the oxygen-containing gas is injected to the aquifer by a plurality of gas injectors spaced less than 10 ft. apart.

25. (New) The method according to claim 21, wherein injection frequency and volume at each injection point having the relationship according to the following equation:

$$e^{[(-V \times F \times N \times H)/(W \times B \times Q)]} > 0.50$$

Wherein:

e = natural exponential

V = volume of gas injected at each injection point (ft^3)

F = frequency of injections (number of injections per day)

N = number of gas injection points

W = width of the treatment zone perpendicular to groundwater flow path (ft)

B = vertical thickness of treatment zone (ft)

Q = specific discharge of ground water to the treatment zone (ft/day)

H = Henry's Constant for contaminant of interest ((mg/L-water)/(mg/L-air))

26. (New) The method as claimed in claim 21, wherein the loss of contaminant(s) from volatilisation is less than 50% by weight.

27. (New) The method according to claim 21, wherein said contaminant is selected from the group consisting of (a) methyl-t-butyl ether (MTBE), (b) t-butyl alcohol (TBA), and (c) a mixture thereof; wherein at least a portion of the contaminant is degraded to carbon dioxide by said microbial culture.

28. (New) The method according to claim 21, wherein each injection of oxygen-containing gas at each injection point lasts from about 0.3 to about 2 minutes.

29. (New) A method for in situ remediation of an aquifer having a treatment zone through which passes water contaminated with at least one chemical contaminant, which method comprises injecting, by at least two conduits, an oxygen-containing gas at a pressure of at least 5 psig above the hydrostatic pressure at injection points by pulsed injection at a frequency from about once a week to about ten times a day, wherein each injection of oxygen-containing gas at each injection point lasts from about 0.05 to about 4 minutes;

30. (New) The method as claimed in claim 29, wherein the loss of contaminant(s) from volatilization is less than 50% by weight.

31. (New) The method according to claim 29, wherein said contaminant is selected from the group consisting of (a) methyl-t-butyl ether (MTBE), (b) t-butyl alcohol (TBA), and (c) a mixture thereof; wherein at least a portion of the contaminant is degraded to carbon dioxide by said microbial culture.

32. (New) The method according to claim 29, wherein each injection oxygen-containing gas at each injection point lasts from about 0.3 to about 2 minutes.

33. (New) The method according to claim 29, wherein injection frequency and volume at each injection point having the relationship according to the following equation:

$$e^{[(-V \times F \times N \times H)/(W \times B \times Q)]} > 0.50$$

Wherein:

e = natural exponential

V = volume of gas injected at each injection point (ft^3)

F = frequency of injections (number of injections per day)

N = number of gas injection points

W = width of the treatment zone perpendicular to groundwater flow path (ft)

B = vertical thickness of treatment zone (ft)

Q = specific discharge of ground water to the treatment zone (ft/day)

H = Henry's Constant for contaminant of interest ((mg/L-water)/(mg/L-air))

34. The method of claim 33, wherein, $e^{[(-V \times F \times N \times H)/(W \times B \times Q)]}$ is greater than 0.80.

35. The method according to claim 33, wherein said contaminant is an oxygenate chemical, wherein $e^{[(-V \times F \times N \times H)/(W \times B \times Q)]}$ is greater than 0.90 and the contaminant loss from volatilzation is less than 10% by weight.

36. A method for in situ remediation of an aquifer having a treatment zone through which passes water contaminated with at least one chemical contaminant, which method comprises injecting, by at least two conduits, an oxygen-containing gas at a pressure of at least 5 psig above the hydrostatic pressure at injection points with injection frequency and volume at each injection point having the relationship according to the following equation:

$$e^{[(-V \times F \times N \times H)/(W \times B \times Q)]} > 0.50$$

Wherein:

e = natural exponential

V = volume of gas injected at each injection point (ft^3)

F = frequency of injections (number of injections per day)

N = number of gas injection points

W = width of the treatment zone perpendicular to groundwater flow path (ft)

B = vertical thickness of treatment zone (ft)

Q = specific discharge of ground water to the treatment zone (ft/day)

H = Henry's Constant for contaminant of interest ((mg/L-water)/(mg/L-air))

37. The method of claim 36, wherein, $e^{[(-V \times F \times N \times H)/(W \times B \times Q)]}$ is greater than 0.80.

38. The method according to claim 36, wherein said contaminant is an oxygenate chemical; wherein $e^{[(-V \times F \times N \times H)/(W \times B \times Q)]}$ is greater than 0.90 and the contaminat loss from volatilizaiton is less than 10% by weight.